PRODUCT SPECIFICATION SHEET



Customer	–		
Customer P/N	TBA		
Product Type	Temperature Compensated Crystal Oscillator		
Part Number	9T32000003	Version	S0
Part Description	SMD TCXO 2.0 x 1.6		
Nominal Frequency	32.000000MHz		

Prepared	Han Shuang
Reviewed	Kuro Peng
Approved	Jay Lee
Date	2020-11-19

Customer's Approval & Date：

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RoHS COMPLIANT

Pb Lead-Free

Moisture Sensitivity Level 1

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1. History of Specification Revision

Ver.	Contents	Date	Reviser	Remark
S0	Initial release	2020-11-19	Han Shuang	

2. Electrical Specifications

2.1 Operation conditions

#	Parameters	Min.	Typ.	Max.	Unit	Remark
1	Nominal frequency		32.000000		MHz	
2	Supply voltage (V_{DD})	-	1.8	3.600	V	
3	Current consumption	-	-	2.0	mA	
4	Operating temperature range	-20	-	+70	℃	
5	Storage temperature range	-40	-	+85	℃	

2.2 Output characteristics

#	Parameters	Min.	Typ.	Max.	Unit	Remark
1	Output type		Clipped sine wave		-	Decoupling capacitor is required in external circuit
2	Standard output Load		10 KΩ//10 pF		-	
3	Output level	0.8	-	1.2	V_{pp}	
4	Duty cycle	40	50	60	%	Ground level
5	Harmonics	-	-	-5	dBc	
6	Start-up time vs. frequency	-	-	2.0	ms	Within ±0.5 ppm
7	Start-up time vs. output level	-	-	2.0	ms	≥90% of Vpp

2.3 Frequency characteristics

#	Parameters	Min.	Typ.	Max.	Unit	Remark
1	Nominal frequency		32.000000		MHz	
2	Frequency tolerance after reflow	-1.5	-	+1.5	ppm	At 25±2℃ after 2 times reflow, refer to nominal frequency
3	Frequency stability vs. temperature	-2.5	-	+2.5	ppm	Refer to frequency at 25 ℃ within operating temperature range
4	Frequency stability vs. supply voltage	-0.1	-	+0.1	ppm	±5% VDD variation
5	Frequency stability vs. load variation	-0.1	-	+0.1	ppm	±5% load variation
6	Aging over 1st year	-1.0	-	+1.0	ppm	

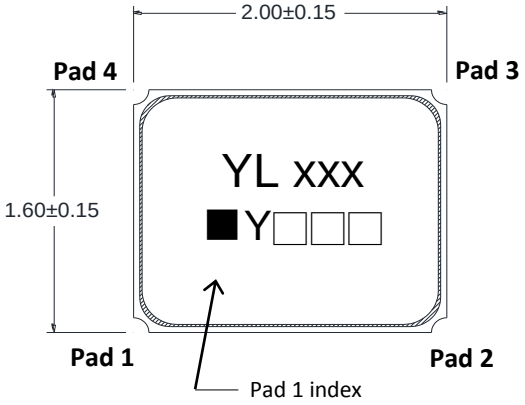
2.4 Phase noise characteristics

#	Parameters	Min.	Typ.	Max.	Unit	NOTE
1	Phase noise at 10Hz offset	-	-	-75	dBc/Hz	At 25±2°C
2	Phase noise at 100Hz offset	-	-	-100	dBc/Hz	At 25±2°C
3	Phase noise at 1kHz offset	-	-	-126	dBc/Hz	At 25±2°C
4	Phase noise at 10kHz offset	-	-	-139	dBc/Hz	At 25±2°C
5	Phase noise at 100kHz offset	-	-	-144	dBc/Hz	At 25±2°C

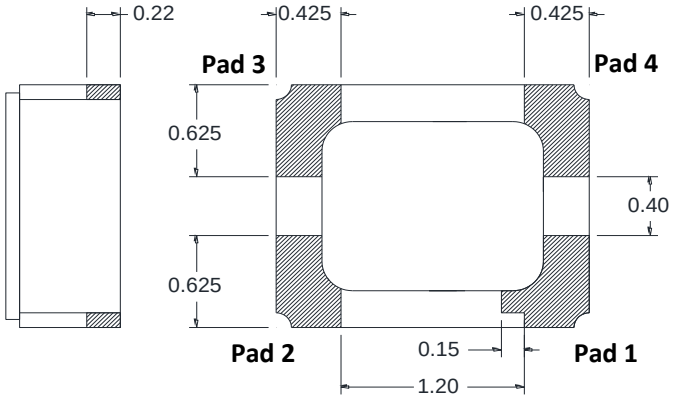
3. Product Design

3.1 Package dimensions and pad functions

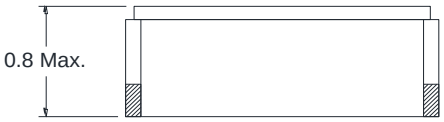
Top view



Unit : mm



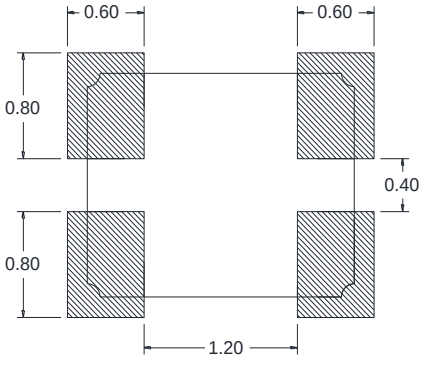
Bottom view



Lateral view

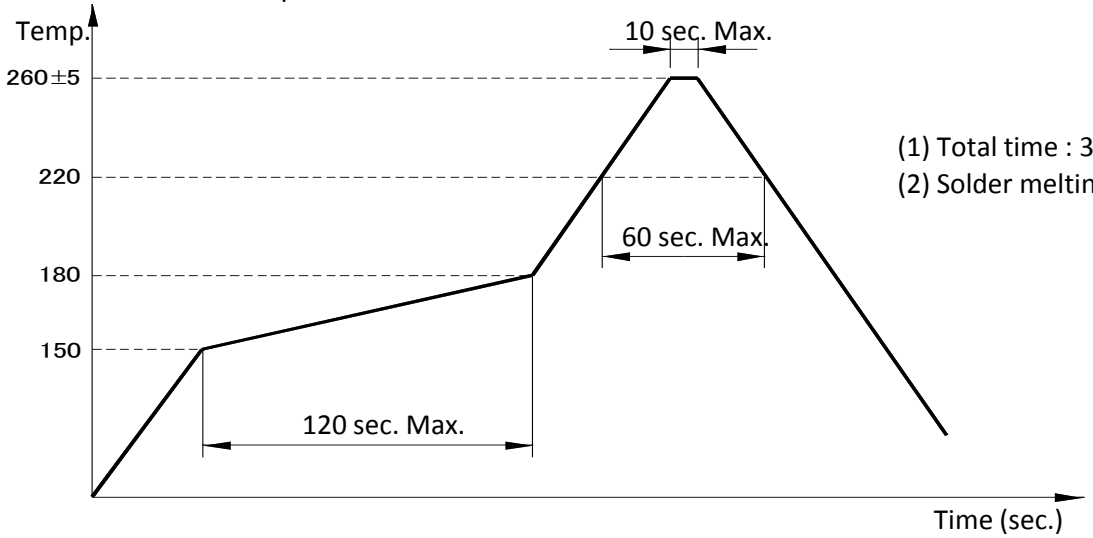
Pad	Function	Symbol
1	NC or GND (Ground recommended)	NC
2	Ground	GND
3	Output	OUT
4	Supply voltage	V_{DD}

3.2 Recommended land pattern



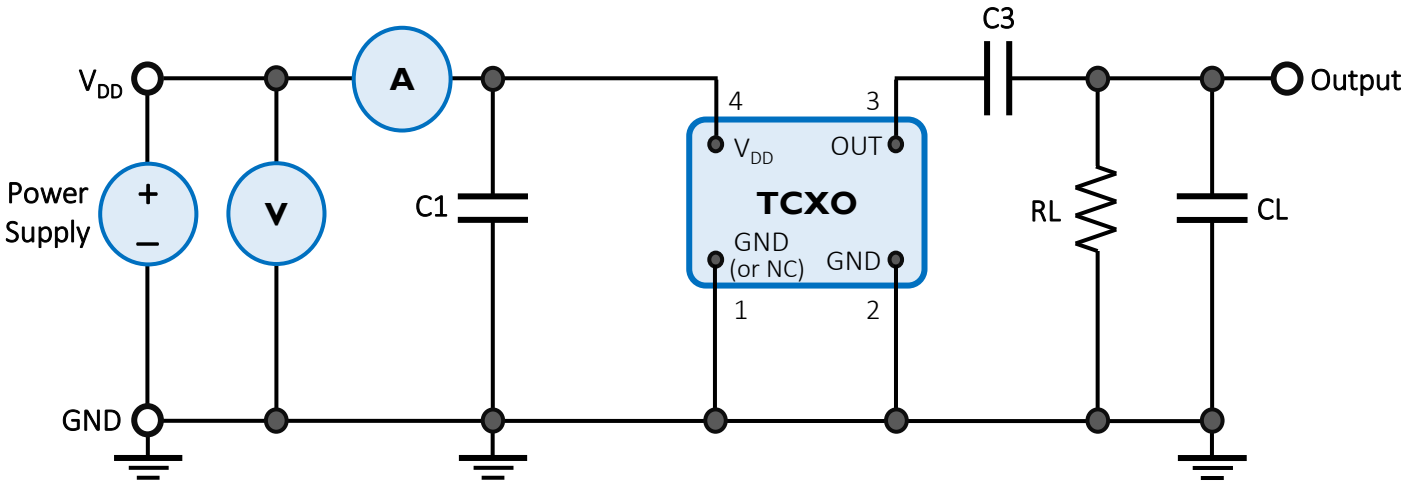
Unit : mm

3.3 Recommended reflow profile



(1) Total time : 360 sec. Max.
(2) Solder melting point : 225℃

4. Testing Circuit



External Components:

Parts	Function	Recommended
C1	AC noise bypass for V_{DD}	10nF
C3	DC block for output	10nF
RL	Load resistance	10KΩ
CL	Load capacitance	10pF